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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TOLIN, MICHAEL A

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/654,765	Applicant(s) NORDMAN, PAUL S.	
	Examiner MICHAEL A. TOLIN	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,7,9-13,15,17,20-22,25 and 29-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7,9-13,15,17,20-22,25 and 29-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 3, 4, 7, 9-13, 15, 17, 20-22, 25, and 29-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The new language “resistant to shrinkage” or “shrinkage resistant” in independent claims 1 and 13 does not appear to be supported by the original disclosure. The original disclosure does provide support for aliphatic epoxy resin (for example, Applicant's specification, paragraph 22). The examiner acknowledges that some aliphatic epoxy resins have low shrinkage upon curing, however no evidence has been provided that all aliphatic epoxy resins are resistant to shrinkage. Further, the examiner does not find any discussion of resin shrinkage in the specification. Accordingly, it does not appear Applicant possessed the limitation of an aliphatic epoxy resin resistant to shrinkage at the time of the invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 4, 7, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day (US 5665450) in view of the collective teachings of Demeester (US 5885714), Bain (US 4793108), Shorr (US 3081205), and Padden (US 5500272), and further in view of Luvisi (US 3534004).

Day teaches a method of forming a structural window panel for an aircraft comprising the steps of providing a plurality of layers of generally optically transparent fiber impregnated resin tape (prepreg) wherein the index of refraction of the fibers matches that of the resin, heating the prepreg layers within a tool to cause the resin to flow and cure, thereby producing a structural window panel (Abstract; column 1, lines 52-56; column 2, lines 5-13; column 3, lines 39-65; column 7, lines 13-42; column 9, lines 24-44; column 10, lines 63-65; column 11, lines 24-29 and lines 47-67; column 12, lines 1-12; column 13, lines 13-17; column 15, lines 17-18).

Day differs from the claims in that there is no teaching of interleaving the prepreg between a plurality of metal sheets which form a frame structure wherein the metal sheets define an opening. However, it is generally well known in the art of aircraft window manufacture to provide an embedded reinforcing material around the periphery

Art Unit: 1791

of a window to provide improved strength and rigidity. For example, Demeester provides a steel, aluminum, or metal alloy reinforcing member 5 embedded around the periphery of an aircraft window for improved rigidity around the periphery (Abstract; column 1, lines 54-56; column 2, lines 1-20). Bain teaches an embedded reinforcing member around the periphery of an aircraft window for transmitting load around the window edge and providing increased strength in the peripheral critical shear-bearing area of the window pane (column 1, lines 25-50). While Demeester and Bain are directed to singular reinforcing members, it is also known to provide a plurality of metal reinforcing sheets around the periphery of an aircraft window. For example, Shorr provides aluminum, titanium, steel, or composite reinforcing frames 7 and 8 embedded in the periphery (column 3, lines 5-14; column 4, lines 39-61). It is also noted that Shorr provides mounting holes through the metal reinforcing frames (column 5, lines 43-46). It is generally known in the art of manufacturing composite structures from prepreg layers that multiple thin metal sheets can be provided between the prepreg layers in areas which receive fasteners through mounting holes in order to provide sufficient reinforcement in the fastener area, allow fewer prepreg layers, and thereby save cost and weight, as evidenced by Padden (Abstract; Figures 1-5B; column 1, lines 5-13 and lines 35-49; column 3, lines 14-17). Padden is also directed to aircraft applications (column 1, lines 12-13). As to interleaving prior to heating, Padden suggests interleaving prior to flowing of the matrix resin to achieve strong bonding and interlocking between the resin and metal reinforcing sheets (column 1, lines 35-58; column 2, lines 29-67). Shorr also suggests interleaving (column 8, lines 65-75; column

Art Unit: 1791

9, lines 1-20). Collectively, Demeester, Bain, Shorr, and Padden clearly suggest embedding one or more metal reinforcing sheets around the periphery of an aircraft window by interleaving the metal sheets with the prepreg layers of Day prior to heating to flow and cure the resin. Only the expected result of reinforcing the periphery of the window has been achieved. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the claimed interleaving limitation to result in the claimed panel having a see-through window portion in the frame structure because one of ordinary skill in the art would have been motivated to provide the window of Day with peripheral reinforcement in view of the collective teachings of Demeester, Bain, Shorr, and Padden.

It is also noted that the claims do not appear to distinguish over a single metallic frame structure which is provided by, for example, a strip of metal for each side of the frame. Such is clearly suggested by Shorr (column 7, lines 31-49). While Shorr does not explain why one might use metal strips to form the frame, one of ordinary skill in the art would have readily appreciated that a large amount of waste would be produced by providing a large metallic sheet and cutting out the opening for the window. It would have been readily apparent to one of ordinary skill in the art that waste is substantially reduced by making the frame from strips.

As to the newly claimed aliphatic epoxy resin, such materials are known to be suitable for aircraft window applications. Luvisi explains that such materials are flame resistant, are colorless, have high color stability, and are useful in aircraft canopies and windows (column 1, lines 54-62; column 3, lines 2-3 and lines 13-52; column 5, lines 27-

Art Unit: 1791

29). Additionally, Day indicates that practically all transparent polymers are suitable (column 7, line 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the claimed aliphatic epoxy resin as the matrix material because one of ordinary skill in the art would have been motivated to use any known suitable polymer for aircraft window applications in accordance with the teachings of Day and Luvisi. As to the property of being resistant to shrinkage, as argued by Applicant, such is inherent in the use of aliphatic epoxies.

The limitations of claims 3 and 4 are clearly suggested by Day (column 7, lines 13-42; column 11, lines 48-67; column 12, lines 1-12).

The limitations of claims 7 and 9-11 have been satisfied for the reasons set forth above.

Regarding claim 12, the use of prepreg tape having a width within the claimed range is well known in the art of composite manufacture. For example, such widths are known to be suitable for use with automated layup devices to achieve high speed and accurate layup of the prepreg material. Additionally prepreg tape having a width of less than 12 inches would naturally be used for windows having dimensions than 12 inches to avoid trimming large amounts of prepreg and thereby producing excessive waste. Selection of prepreg having a suitable width involves no more than expected and routine design choice for any of these reasons.

5. Claims 13, 15, 17, 20-22, 25, and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day in view of the collective teachings of Demeester, Bain,

Shorr, and Padden, and further in view of Luvisi as applied to claims 1, 3, 4, 7, and 9-12 above, and further in view of Graff (US 3074832).

Claim 13 requires a metal sheet having a plurality of openings and covering the metal sheet with prepreg to form a plurality of window portions which are spaced apart. Thus claim 13 differs from the modified method of Day in that the peripheral reinforcing sheet also includes a portion which extends through the middle of the window to form multiple window portions. Such is generally known in the window art, as evidenced by Graff (Figures 3 and 3a). Graff is directed to improving the rigidity and strength of fiber reinforced resin window laminates for a variety of applications (column 1). For example, Graff explains that for some applications it is disadvantageous for these transparent materials to have low rigidity (column 1, lines 27-29). Graff suggest the use of a metal frame for reinforcing transparent epoxy resin/glass fiber composites (column 1, lines 70-72; column 2, lines 1-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the reinforcing frame in the modified method of Day with a central member to provide the claimed plurality of openings because one of ordinary skill in the art would have been motivated to further reinforce the window in accordance with known methods as evidenced by Graff.

The limitations of claims 15, 17, 20-22, 25 and 29 are rejected for the reasons set forth above.

The limitations of claims 30-33 are considered conventional in the art of lamination of prepreg materials for providing suitable heat and pressure to form a laminated product. Additionally, Day suggests a caul plate (column 16, lines 38-52),

pressures within the claimed range, and application of vacuum (column 11, lines 5-17). Further, determination of appropriate temperatures and pressures for curing the resin to achieve adequate curing and consolidation involves no more than expected and routine experimentation in view of the pressure range suggested by Day. Different resins require different curing temperatures, as is well known in the art.

Response to Arguments

6. Applicant's arguments filed 19 March 2008 have been fully considered but they are not persuasive.

Applicant's arguments with respect to Graff and Skubic (US 5039566) are moot in view of the new grounds of rejection.

Applicant argues that Day does not suggest the use of an integral metal frame. Day was not relied upon for this limitation. It is clear from Demeester, Bain, and Shorr that integral peripheral reinforcement using a metal frame is desirable in aircraft window applications, as set forth in the rejection above. It is clear from Padden that such metal sheets can be integrated into fiber reinforced laminates using epoxy as a resin (Figure 1). Similarly, Day need not teach a window which requires peripheral reinforcement for one of ordinary skill in the art to appreciate that Day's window would benefit from such reinforcement in accordance with the teachings of Demeester, Bain, Shorr, and Padden.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Padden is not directed to windows. Padden was not relied upon for this limitation. The primary reference to Day is directed to windows formed from transparent glass fiber reinforced prepreg. Padden was cited to show that the use of thin metal reinforcing sheets interleaved with fiber reinforced preregs provides particular advantages where fasteners are provided through the composite product and that such interleaving is a suitable manner of providing the metal reinforcing sheet.

Applicant argues that there is no suggestion in Shorr to provide a matching index of refraction between the fibers in the resin or to provide a peripheral frame structure which is integral with a transparent window assembly. As to the index of refraction, as noted above, the primary reference to Day provides this teaching. As to providing an integral frame structure, Shorr provides an integral frame structure around the periphery of the transparent window assembly (metal sheets 7, 8; Figures 2-8; column 7, lines 59-75; column 8, lines 1-59).

Applicant argues that improper hindsight was applied against the claims. The examiner disagrees. Day provides a method of manufacturing a transparent window assembly using preregs of glass fibers reinforced with transparent resin having a matching index of refraction. Demeester, Bain, Shorr, and Padden collectively suggest the benefits of providing a window with an integral metal sheet around the periphery for providing reinforcement by interleaving metal sheets with preregs. Like the cited prior art, Applicant seeks to provide peripheral reinforcement to increase the strength of a

window (Applicant's specification, paragraph 7, 8, and 27). Only the expected result of increased strength by providing an integral peripheral reinforcement has been achieved.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. TOLIN whose telephone number is (571)272-8633. The examiner can normally be reached on M-F 9am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 1791

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/Michael A Tolin/
Examiner, Art Unit 1791

/Richard Crispino/
Supervisory Patent Examiner, Art Unit 1791